

MAR 1952 24-44

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REPORT NO.

25X1A

CD NO.

COUNTRY	USSR	DATE OF INFORMATION	1951
SUBJECT	Scientific - Medicine, virology		
HOW PUBLISHED	Monthly periodical	DATE DIST.	14 Mar 1953
WHERE PUBLISHED	Leningrad	NO. OF PAGES	4
DATE PUBLISHED	May 1951	SUPPLEMENT TO REPORT NO.	
LANGUAGE	Russian		ILLEGIB

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SOURCE Priroda, No 5, 1951, pp 84 - 86, (Per Abs 211T76).

MOSCOW SCIENTIFIC SESSION
DEDICATED TO THE WORK OF RUSSIAN SCIENTIST D. I. IVANOVSKIY

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The Department of Biological Science of the Academy of Sciences USSR, the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, and the Academy of Medical Sciences USSR convened in Moscow on 21 and 22 November 1950 in a general session to commemorate the death, 30 years earlier, of the great Russian scientist D. I. Ivanovskiy (10 October 1864 - 20 June 1920).

D. I. Ivanovskiy started as a classic student of the natural sciences. As the acknowledged founder of virology, he was the first in the world to establish on the example of the mosaic disease of tobacco the fact that filterable viruses exist. His work in plant physiology and in soil microbiology also is significant. He can be called one of the founders of this important branch of natural science, together with F. M. Kamenskiy, I. M. Vinogradskiy, and P. A. Kostiychev. He was the first to give a systematic account of the basis of soil microbiology and, partly, of microbiology in general. (His "Activity of Microorganisms in the Soil" was published in Trudy Imp. Volinogo Ekon. Oshch. No 6, 1891.) Up to now this part of the activities of this remarkable Russian scientist had been known to only a few, and in the overwhelming majority of cases nothing, or very little, was known of Ivanovskiy himself. The same holds true for the general meeting of the three academies now being discussed. There was not one report at the meeting about Ivanovskiy as a general biologist or a soil microbiologist.

The meeting aroused great interest in scientific circles in Moscow and attracted a number of scientists from widely different branches of microbiology and virology. The reports threw light on such questions of contemporary science as the nature of viruses, the span of life, and many others. The interest in problems falling within this range has grown, in the last year especially, due to the work done by O. B. Lepeshinskaya and G. M. Roshn'yan.

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The following papers were presented at the first meeting: "The Life and Activities of D. I. Ivanovskiy," by Academician N. A. Maksimov; "The Scientific Heritage of D. I. Ivanovskiy," by V. L. Ryzhkov, Associate Member, Academy of Sciences USSR; "D. I. Ivanovskiy's Views on Evolution," by Prof S. L. Sobol'; and "Recollections of D. I. Ivanovskiy," by Prof E. A. Zhemchuzhnikov. The latter report was read in absentia.

During the second meeting, the following papers were heard: "D. I. Ivanovskiy's Discoveries in the Light of Modern Knowledge of Viruses," by K. S. Sukhov, Doctor of Biological Sciences; "The Discovery of Viruses and Modern Medicine," by L. A. Zil'ber, Acting Member, Academy of Medical Sciences USSR; and "D. I. Ivanovskiy and Modern Medical Virology," by M. P. Chumakov, Associate Member, Academy of Medical Sciences USSR. Another talk had been scheduled on achievements in the fight against tobacco virus diseases, but it was canceled.

In a brief introductory address, Academician N. N. Anichkov, the presiding chairman, outlined the outstanding merits of Ivanovskiy and announced that on 19 October 1950 the Council of Ministers USSR had passed a resolution to immortalize the name of this outstanding Russian scientist by naming the Institute of Virology Academy of Medical Sciences USSR after him. It would publish his works and establish a prize in his name for outstanding work in virology. Academician N. A. Maksimov then spoke on Ivanovskiy the man and Ivanovskiy the many-sided, broadly educated scientist and teacher. The speaker had known Ivanovskiy in 1898 at the Chair of Physiology of Petersburg University, where he attended the elective course of lectures held by Ivanovskiy. The course was original and was primarily a history of plant physiology. At the time, Ivanovskiy tried to stress especially the superiority of Russian scientists. In 1902, V. T. Palladin succeeded Ivanovskiy, who took over the corresponding chair in Warsaw, where he worked with M. S. Tevst. All of Ivanovskiy's work in microbiology was done in Petersburg; in Warsaw he worked only on plant physiology.

Ivanovskiy died in Rostov-on-Don in nearly complete obscurity. Prof V. L. Ryzhkov spoke on the scientific legacy left by Ivanovskiy. He stated that Ivanovskiy's most important work was not in the field of plant physiology, as Ivanovskiy himself thought, but in the field of filterable viruses. Ivanovskiy's work was abstracted in the same journal in which work by Loeffler and Frosch was being published; yet these scientists, who discovered the existence of viruses, i.e., that of the foot and mouth disease, 6 years after Ivanovskiy, did not even mention this investigator. While Ryzhkov was giving his report, he was frequently interrupted by questions regarding some points which were of interest because of the great current importance of the subject.

Virology finally broke out of its bonds. Its outposts in the past had been in the field of phages, tumors, etc. Ivanovskiy not only founded the science of virology and initiated the study of the tobacco mosaic disease; he also developed the pathoanatomic method of study of the histology of virus diseases of plants. The significance of his work remains fully valid today in this respect. However, of even greater significance was his work on occlusions within the cells of sick plants. These occlusions are crystal-like formations, the Ivanovskiy crystals, which break down into spindle-like crystals. Figuratively, we speak of the crystallography of viruses. Many viruses, said Ryzhkov, are able to crystallize and thus they represent neither living forms nor crystals.

After giving an extremely interesting analysis of the question "Life in Crystals," Ryzhkov said that crystalline forms develop in nature as the simplest forms of life and that study of the original form of these crystals can be a link to the study of crystals (as a whole).

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Ryzhkov recalled the first conference on virus diseases in Khar'kov 15 years ago and the fact that at this meeting, in which veterinarians and medical men took part, the most outstanding participant was the greatest Soviet microbiologist, N. F. Gamaleya, the only scientist in the world who may claim priority in work on viruses besides Ivanovskiy. (Here Ryzhkov had in mind the experiments in which Gamaleya in 1886 proved the infectious properties of the filtered blood of a calf sick with cattle plague [rinderpest].)

Gamaleya was not at the meeting, but sent in a paper on the question of the nature of the virus. The theses of this paper, according to Ryzhkov, were very challenging. Gamaleya recognized that viruses are organisms and rejected the idea that a virus is something that adheres to a protein crystal. Being pure nucleoproteids, the viruses are less complex than protoplasm. Prof Ryzhkov showed that on the discovery of virus proteins, Engels' definition of life became quite irrefutable.

The tobacco mosaic virus is alive, although it is not an organism in the actual sense of the word. It is childish to discuss whether viruses are alive or not. New facts have been discovered here. There are forms of life which are not covered by our concept of protoplasm: this is the discovery of Ivanovskiy. The new facts and new ideas introduced by G. B. Lepeshinskaya are of great significance and inspire new courageous efforts in research. In Ryzhkov's opinion, there must be life both in the form of protoplasm and in the form of virus proteins.

It is quite evident that a number of basic statements in Prof Ryzhkov's interesting report add much to an objective appraisal of G. M. Rosh'yan's book, The Nature of Viruses and Microbes, which already has become an important progressive part of our scientific literature.

Ivanovskiy published only one lecture on the question of the theory of evolution ("Experimental Methods in Problems of Evolution," a lecture given at a meeting at the Warsaw Imperial University on 30 August 1908; Warsaw University News, No 3, 1908.)

This most interesting presentation of Ivanovskiy and some of his other works furnished excellent material by which to judge the views on evolution held by the founder of virology. This was the subject of the report made by Prof S. L. Sobol' (published in Mikrobiologiya, No 6, 1950). The speaker remarked that, in spite of some of his errors, Ivanovskiy's position as a scientist was very advanced. He recognized the interrelation between outside matter and the organism, recognized also that acquired characteristics can be inherited. He regarded the species as being a historic category, and thought deeply about the motive forces of evolutionary processes.

A comprehensive lecture by K. S. Sukhov was of great interest, nearly as great as that evoked by Ryzhkov's paper. The speaker said that the significance of Ivanovskiy's work grew with every year. His views on viruses came very close to modern ideas on the subject. Nucleoproteids may be spoken of as a form in which living matter exists. To speak of a virus molecule may not be correct; it has a complex organization. As compared to protoplasm, viruses are very simple, but they are already differentiated into an outer and an inner part. Protein particles in themselves are not alive, since, for them to be alive, union with some ~~other~~ substances, such as water, is necessary.

When isolated, the virus particle is homogeneous nonliving matter. In dried virus preparations there is no metabolism; however, the virus can come to life. In Ivanovskiy's opinion viruses originated from bacteria; that is, they are a form in which bacteria exist.

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It will be necessary to carry out careful experiments to verify some of Ivanovskiy's writings, because one cannot discount the effect of adsorption of viruses to bacterial cells and because he did not know the details of infectiousness [contagiousness?] of the mosaic virus. Ivanovskiy's ideas about the connection between microbes and viruses were further developed by Gamaleya, Krestovnikov, Bosh'yan, and others. Their work deserves serious consideration. The importance of the positive character of Bosh'yan's conception is evident from the fact that it brings to the teaching of virology the concept of evolution; this is also the idea behind Michurin's work. Bosh'yan's book is imbued with the belief in the progressive growth of virology, which hitherto had been detached from the theory of evolution, so that the question of the ontogenesis of viruses did not even exist. This impasse is sharply evident in the works of foreign virologists.

K. S. Sukhov expressed some interesting ideas in his report regarding the possibility of spontaneous emergence of viruses, and the similarities and differences between plant viruses and animal viruses, etc. Virology now has come to a turning point, and work in which old and persistent views are re-examined is welcome.

L. A. Zil'ber spoke on questions of general virology and its significance in medicine (the propagation of viruses, correlation between viruses and other micro-organisms and macroorganisms, immunity to virus diseases, etc.). The majority of researchers believe that propagation of viruses takes place in the same manner as that of other microorganisms. Adsorption of viruses by live microbes is a fact, but it is not only adsorption but also symbiosis. In certain cases it is possible literally to cultivate viruses on microbes (for instance smallpox on yeast). Under such conditions, changes can be observed in the viruses as well as in the microbes. Whoever isolates virus cultures from microbes is simply misled by the fact that microbes carry viruses. Results [from such experiments] can never be duplicated. The character of immunity in virus diseases is different from that in bacterial diseases. Many viruses, having once lodged in an organism, stay in it for life (such as the virus of herpes, and of cancer of the mammary glands of mice). Some researchers therefore came to the erroneous conclusion that there is immunity against virus diseases. However, precisely those viruses which remain in the organism for life do not confer immunity. Zil'ber finally discussed the problem of cancer as a problem of microbiology.

The success and growth of medical virology was described by M. P. Chumakov, who stated that only a few scientists had foreseen the tremendous role of the new field of learning. They were N. F. Gamaleya in 1907 and I. I. Mechnikov. The speaker reported on the classic research work done by Gamaleya and M. A. Morozov, the works of Ye. I. Turevich, V. L. Ryzhkov, and many other Soviet virologists. He stressed that science develops from the conflict of opinions and critically reviewed the book by G. M. Bosh'yan as an unsuccessful attempt to "literally turn all ideas upside down." In indicating his profound disagreement with Bosh'yan, Prof Chumakov said of this book that it "has nothing to offer us but confusion." Broad, free discussion on actual questions of contemporary virology and microbiology is a necessity, he stated.

In generally appraising the meeting devoted to the memory of Ivanovskiy, it must be said that due to lack of preparation, not all problems connected with the scientifically creative work of Ivanovskiy could be reviewed. Nevertheless, the meeting benefited those who can relive in memory the achievements of this remarkable Russian scientist and can see clearly the significance of his outstanding labors for contemporary biology and medicine.

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